IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF MASSACHUSETTS

PHILIPS LIGHTING NORTH AMERICA CORPORATION and PHILIPS LIGHTING HOLDING B.V., Plaintiffs, vs. DECO ENTERPRISES, INC. (d/b/a DECO LIGHTING), Defendant.	Civil Action No. 1:17-cv-10624 **JURY TRIAL DEMANDED**

COMPLAINT FOR PATENT INFRINGEMENT

Plaintiffs Philips Lighting North America Corporation and Philips Lighting Holding B.V. (collectively, "Philips Lighting") for their complaint against Deco Enterprises, Inc. (d/b/a Deco Lighting) ("Defendant") allege as follows:

NATURE OF THE ACTION

1. This is a civil action for patent infringement arising under the patent laws of the United States, 35 U.S.C. § 1 *et seq*., including 35 U.S.C. § 271, which gives rise to the remedies specified under 35 U.S.C. §§ 281 and 283-285.

THE PARTIES

2. Plaintiff Philips Lighting North America Corporation is a corporation organized and existing under the laws of Delaware, is registered to do business in the Commonwealth of Massachusetts, and has a place of business and resides at 3 Burlington Woods Drive, Burlington, Massachusetts 01803.

3. Plaintiff Philips Lighting Holding B.V. is a corporation organized and existing under the laws of the Netherlands with its principal place of business at High Tech Campus 45, 5656 AE Eindhoven, The Netherlands.

4. On information and belief, Defendant Deco Enterprises, Inc. (d/b/a Deco Lighting) is a corporation organized and existing under the laws of California with its principal place of business at 2917 Vail Avenue, Commerce, California 90040.

JURISDICTION AND VENUE

5. This Court has subject-matter jurisdiction over this patent infringement action pursuant to 28 U.S.C. §§ 1331 and 1338.

6. On information and belief, Defendant has made, used, provided, sold, offered to sell, imported, and/or distributed to others for such purposes, lighting products and systems employing light-emitting diodes ("LEDs") for illumination throughout the United States, including Massachusetts. For example, on information and belief, Defendant's products are offered and sold in Massachusetts through Vanguard Lighting, as listed on Defendant's website (https://www.getdeco.com/agent-locator).

7. This Court has personal jurisdiction over Defendant because, on information and belief, Defendant has regularly and systematically transacted business in this district, directly or through intermediaries, and/or committed acts of infringement in this district. Defendant has also placed infringing products into the stream of commerce by shipping those products into this district or knowing that the products would be shipped into this district.

8. Venue is proper in this judicial district pursuant to 28 U.S.C. §§ 1391(b) and/or 1400(b), as *inter alia* Defendant is subject to personal jurisdiction in this district.

THE PATENTS-IN-SUIT

9. Philips Lighting is a global market leader with recognized expertise in the development, manufacturing, and application of innovative LED lighting solutions.

10. To protect its intellectual property resulting from its significant investments, Philips Lighting applied for and obtained numerous patents directed to various LED inventions and technologies. For example, Philips Lighting's LED-related patents include U.S. Patent Nos. 6,094,014, 6,586,890, 7,038,399, 7,262,559, and 8,070,328 (collectively, the "Patents-in-Suit").

11. U.S. Patent 6,094,014 ("the '014 Patent"), titled "Circuit Arrangement, and Signaling Light Provided with the Circuit Arrangement," was duly and legally issued by the United States Patent and Trademark Office on July 25, 2000. Plaintiff Philips Lighting North America Corporation is the assignee and owner of all right, title, and interest in the '014 Patent, a copy of which is attached as Exhibit 1.

12. U.S. Patent 6,586,890 ("the '890 Patent"), titled "Led Driver Circuit with PWM Output," was duly and legally issued by the United States Patent and Trademark Office on July 1, 2003. Plaintiff Philips Lighting Holding B.V. is the assignee and owner of all right, title, and interest in the '890 Patent, a copy of which is attached as Exhibit 2.

13. U.S. Patent 7,038,399 ("the '399 Patent"), titled "Methods and Apparatus for Providing Power to Lighting Devices," was duly and legally issued by the United States Patent and Trademark Office on May 2, 2006. Plaintiff Philips Lighting North America Corporation is the assignee and owner of all right, title, and interest in the '399 Patent, a copy of which is attached as Exhibit 3.

14. U.S. Patent 7,262,559 ("the '559 Patent"), titled "LEDs Driver," was duly and legally issued by the United States Patent and Trademark Office on August 28, 2007. Plaintiff

Philips Lighting Holding B.V. is the assignee and owner of all right, title, and interest in the '559 Patent, a copy of which is attached as Exhibit 4.

15. U.S. Patent 8,070,328 ("the '328 Patent"), titled "LED Downlight," was duly and legally issued by the United States Patent and Trademark Office on December 6, 2011. Plaintiff Philips Lighting Holding B.V. is the assignee and owner of all right, title, and interest in the '328 Patent, a copy of which is attached as Exhibit 5.

DEFENDANTS' EXEMPLARY INFRINGING PRODUCTS

A. LUCERA

16. Defendant's Lucera products are surface-mounted LED lighting fixtures. According to Defendant, Lucera products are designed for use in stairwells, utility rooms, and other areas requiring maximum light on a constant basis. On information and belief, Defendant offers for sale and sells Lucera products in the United States and this district.

17. Defendant provides a specification sheet for Lucera products on Defendant's website at https://www.getdeco.com/wp-content/themes/deco-digital/pdf/LUCERA_spec.pdf, a copy of which of which is attached as Exhibit 6. The following image from Exhibit 6 shows a Lucera product:

18. The LED driver of a 4' 24W 50K LED Lucera Series with Sensor was reverse-engineered by a third-party vendor, and the resulting schematics are attached as Exhibit 7. The

LED driver includes a Power Integrations TOP245F integrated circuit, a datasheet for which is attached as Exhibit 8.

B. ZEUS

19. Defendant's Zeus products are architectural lighting wall packs. According to Defendant, Zeus products are designed for both interior and exterior lighting contexts. On information and belief, Defendant offers for sale and sells Zeus products in the United States and this district.

20. Defendant provides a specification sheet for Lucera products on Defendant's website at https://www.getdeco.com/wp-content/themes/deco-digital/pdf/ZEUS_spec.pdf, a copy of which is attached as Exhibit 9. The following image from Exhibit 9 shows a Zeus product:

21. The LED driver of a 20W ZEUS Oval LED was reverse-engineered by a third-party vendor, and the resulting schematics are attached as Exhibit 10. The LED driver, produced by Thomas Research Products, includes an Infineon Technologies TDA4863-2G integrated circuit, a datasheet for which is attached as Exhibit 11. A photo of the name plate of the Thomas Research Products LED driver is attached as Exhibit 12. On information and belief, the Thomas Research Products driver is designed to receive a dimmed AC input.

C. CLOUD

22. Defendant's Cloud products are recessed LED luminaires. According to Defendant, Cloud products are designed for use in commercial settings including offices, healthcare, or retail environments. On information and belief, Defendant offers for sale and sells Cloud products in the United States and this district.

23. A copy of a specification sheet for Cloud products is attached as Exhibit 13. The following image from Exhibit 13 shows a Cloud product:

24. The LED Driver of a 59W 2x4 Digital LED Cloud Recessed Troffer was reverse-engineered by a third-party vendor, and the resulting schematics are attached as Exhibit 14. On information and belief, the LED driver, produced by Antron Compact Electronics and labeled "Watt Controls", includes an ST Microelectronics L6562 integrated circuit, a datasheet for which is attached as Exhibit 15. A photo of the name plate of the Watt Controls driver is attached as Exhibit 16.

D. DLED-ARFK4

25. Defendant's DLED-ARFK4 products are LED retrofit kits. According to Defendant, DLED-ARFK4 products are designed for use with existing 4" architectural incandescent, fluorescent, and metal halide housings. On information and belief, Defendant offers for sale and sells DLED-ARFK4 products in the United States and this district.

26. Defendant provides a specification sheet for DLED-ARFK4 products on Defendant's website at https://www.getdeco.com/wp-content/themes/deco-digital/pdf/DLED-ARFK4_spec.pdf, a copy of which is attached as Exhibit 17. The following image from Exhibit 17 shows a DLED-ARFK4 product:

27. The LED driver of a DLED-ARFK4 4" 14W Architectural LED Retrofit-Kit was reverse-engineered by a third-party vendor, and the resulting schematics are attached as Exhibit 18. On information and belief, the LED driver includes an On-Bright SN03A integrated circuit.

E. DSW-LED

28. Defendant's DSW-LED products are LED light sources. According to Defendant, DSW-LED products are designed for indoor commercial uses. On information and belief, Defendant offers for sale and sells DSW-LED products in the United States and this district.

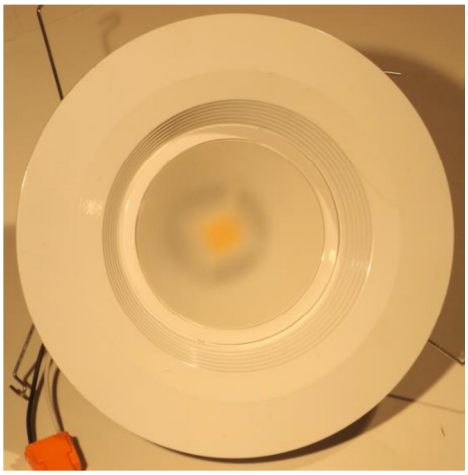
29. Defendant provides a specification sheet for DSW-LED products on Defendant's website at https://www.getdeco.com/wp-content/themes/deco-digital/pdf/DSW-LED_spec.pdf, a copy of which is attached as Exhibit 19. The following image from Exhibit 19 shows a DSW-LED product:

30. The LED driver of a DSW-LED 2' 22W Narrow LED Surface Wraparound was reverse-engineered by a third-party vendor, and the resulting schematics are attached as Exhibit 20. The LED driver, produced by Thomas Research Products, includes an ST Microelectronics L6562 integrated circuit, a datasheet for which is attached as Exhibit 21. A photo of the name plate of the Thomas Research driver is attached as Exhibit 22.

F. AFR56

31. Defendant's AFR56 products are LED retrofit recessed lighting kits. According to Defendant, AFR56 products designed to replace existing incandescent fixtures. On information and belief, Defendant offers for sale and sells AFR56 products in the United States and this district.

32. Photographs of an AFR56 6" Recessed Lamp are attached as Exhibit 23. A representative photograph is shown for example below:



33. The LED driver of an AFR56 6" Recessed Lamp was reverse-engineered by a third-party vendor, and the resulting schematics are attached as Exhibit 24. A photo of the name plate of the LED driver is attached as Exhibit 25. On information and belief, the LED driver is configured to receive a dimmed AC signal.

G. D404-LED

34. Defendant's D404 wall packs are LED light sources. According to Defendant, D404 wall packs are designed for exterior use in commercial environments. On information and belief, Defendant offers for sale and sells D404 wall packs in the United States and this district.

35. Defendant provides a specification sheet for the D404-LED products on Defendant's website at https://www.getdeco.com/wp-content/themes/deco-digital/pdf/D404-LED_spec.pdf, a copy of which is attached as Exhibit 26. The following image from Exhibit 26 shows a D404-LED product:

36. The LED driver of a previous-generation D404 Wallpack (LED20W-36-C0550TE) was reverse-engineered by a third-party vendor, and the resulting schematics are attached as Exhibit 27. The LED driver, produced by Thomas Research Products, includes a Fremont Micro Devices FT822 integrated circuit, a datasheet for which is attached as Exhibit 28.

A photo of the name plate of the Thomas Research driver is attached as Exhibit 29. On information and belief, the Thomas Research driver is designed to receive a dimmed AC input.

37. On information and belief, the LED driver of the current-generation D404 employs the same Watt Controls driver as the CLOUD products—the reverse-engineered schematics of which are attached as Exhibit 14. The Watt Controls driver includes an ST Microelectronics L6562 integrated circuit, a datasheet for which is attached as Exhibit 15. A photo of the name plate of the Watt Controls driver is attached as Exhibit 16.

H. D211-LED

38. Defendant's D211 products are medium round back flood LED light sources. According to Defendant, D211 products are designed for applications requiring flood lights such as parking lots, landscapes, and building facades. On information and belief, Defendant offers for sale and sells D211 products in the United States and this district.

39. Defendant provides a specification sheet for the D211-LED products on Defendant's website at https://www.getdeco.com/wp-content/themes/deco-digital/pdf/D211-LED_spec.pdf, a copy of which is attached as Exhibit 30. The following image from Exhibit 30 shows a D211-LED product:

40. On information and belief, D211-LED products employ the same Watt Controls driver as Cloud products—the reverse-engineered schematics of which are attached as Exhibit 14. The Watt Controls driver includes an ST Microelectronics L6562 integrated circuit, a datasheet for which is attached as Exhibit 15. A photo of the name plate of the Watt Controls driver is attached as Exhibit 16.

COUNT ONE

INFRINGEMENT OF U.S. PATENT NO. 6,094,014

41. Philips Lighting incorporates by reference the allegations in paragraphs 1-40 as if fully set forth herein.

42. On information and belief, Defendant has infringed and is infringing claims of the '014 Patent, including claim 1, in violation of 35 U.S.C. § 271(a) by manufacturing, using, offering to sell, selling, and/or importing infringing products.

43. Claim 1 of the '014 Patent recites:

> 1. A circuit arrangement suitable for operating a semiconductor light source, said circuit arrangement comprising:
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> input terminals for connecting a supply voltage;
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> input filter means;
>
> a converter comprising a control circuit; and
>
> output terminals for connecting the semiconductor light source, wherein said converter generates a current for application to said semiconductor light source, and said control circuit controls said converter to produce a predetermined value of said current at said output terminals, said predetermined value of said current corresponding to an output voltage which is less than a predetermined threshold voltage,
>
> characterized in that the circuit arrangement further comprises voltage detection means for detecting the output voltage at the output terminals, said voltage detection means generating a detection signal when the output voltage exceeds said predetermined threshold voltage.

44. On information and belief, Defendant has directly infringed and is directly infringing claim 1 of the '014 Patent by making, using, offering to sell, selling, and/or importing at least Zeus, Cloud, DSW-LED, 211-LED, and D404-LED (current generation) products in this judicial district and elsewhere in the United States.

Infringing Zeus Products

45. On information and belief, Zeus products contain a circuit arrangement for operating an LED light source, as shown for example in the schematics of Exhibit 10. The individual components cited below refer to Exhibit 10 unless stated otherwise.

46. On information and belief, Zeus products include input terminals for connecting a supply voltage, for example Black Wire (L) and White Wire (N) that connect to an AC mains input.

47. On information and belief, Zeus products include input filter means, for example capacitor C1 and inductor L1 to filter the input.

48. On information and belief, Zeus products include a converter comprising a control circuit, for example a flyback converter with transformer T1 and diode D5 that is controlled by a control circuit IC U1.

49. On information and belief, Zeus products include output terminals for connecting the semiconductor light source, wherein the converter generates a current for application to the semiconductor light source, and the control circuit controls the converter to produce a predetermined value of the current at the output terminals, the predetermined value of the current corresponding to an output voltage which is less than a predetermined threshold voltage. For example, output terminals Red Wire (+DC) and Black Wire (-DC) connect to the LEDs. The flyback converter generates current applied to the LEDs. The flyback converter is controlled by

IC U1 to deliver constant current (Exhibit 12, "Constant-Current Dimmable LED Driver") to the output. The flyback converter output voltage +DC will be clamped at approximately 42 V.

50. On information and belief, Zeus products include voltage detection means for detecting the output voltage at the output terminals, the voltage detection means generating a detection signal when the output voltage exceeds the predetermined threshold voltage. For example, a voltage detection circuit includes zener diodes D9 and D10, the voltage divider formed by R29 and R30, and transistor Q3, that outputs a detection signal when the output voltage +DC exceeds 42 V—the breakdown voltage of series-connected Zener diodes D9 and D10. The detection signal propagates through opto-isolator U3 and is input to IC U1 at VSENSE pin 1 and VAOUT pin.

Infringing Cloud Products

51. On information and belief, Cloud products include a power supply for an LED light source, as shown for example in the schematics of Exhibit 14. The individual components of the Cloud products cited below refer to Exhibit 14 unless stated otherwise.

52. On information and belief, Cloud products include input terminals for connecting a supply voltage, for example input terminals Black Wire and White Wire that connect to an AC mains input.

53. On information and belief, Cloud products include input filter means, for example capacitor C1, C24, and inductors of transformer T1 that filter the AC mains input.

54. On information and belief, Cloud products include a converter comprising a control circuit, for example a flyback converter comprising transformer T2 and diode D22 that is controlled by controllers IC U3 and transistor Q3.

55. On information and belief, Cloud products include output terminals for connecting the semiconductor light source, wherein the converter generates a current for application to the semiconductor light source, and the control circuit controls the converter to produce a predetermined value of the current at the output terminals, the predetermined value of the current corresponding to an output voltage which is less than a predetermined threshold voltage. For example, output terminals Red Wire (LED1+) and Blue Wire (LED 1-) connect to the LEDs. The flyback converter generates current for application to the LEDs. The flyback converter is controlled by IC U3 to deliver one of three constant current values—700mA, 1050mA, 1400mA—(Exhibit 16, "Output Current: WC3 700mA, WC2: 1050mA, WC3: 1400mA") to the output. The flyback converter output voltage LED+ will be clamped at approximately 42 V.

56. On information and belief, Cloud products include voltage detection means for detecting the output voltage at the output terminals, the voltage detection means generating a detection signal when the output voltage exceeds the predetermined threshold voltage. For example, a voltage detection circuit includes diodes D13, D16, D24, D25, resistors R65 and R66, and transistor side of opto-isolator, that provides a detection signal when the output voltage exceeds the cumulative breakdown voltage of 42 V of the series-connected diodes D13, D16, D24, D25.

Infringing DSW-LED Products

57. On information and belief, DSW-LED products contain a circuit arrangement suitable for operating an LED light as shown for example in the schematics of Exhibit 20. The individual components of the DECO DSW-LED products cited below refer to Exhibit 20 unless stated otherwise.

58. On information and belief, DSW-LED products include input terminals for connecting a supply voltage, for example input terminals Black Wire (L) and White Wire (N) that connect to an AC mains input.

59. On information and belief, DSW-LED products include input filter means, for example, capacitor C1 and inductor L1, in part, filter the AC mains input.

60. On information and belief, DSW-LED products include a converter comprising a control circuit, for example a flyback converter comprising transformer T1 and diode D7 that is controlled by a control circuit IC U1.

61. On information and belief, DSW-LED products include output terminals for connecting the semiconductor light source, wherein the converter generates a current for application to the semiconductor light source, and the control circuit controls the converter to produce a predetermined value of the current at the output terminals, the predetermined value of the current corresponding to an output voltage which is less than a predetermined threshold voltage. For example, output terminals Red Wire and Blue Wire connect to the LEDs. The flyback converter, comprising transformer T1 and diode D7, generates current applied to the LEDS. The flyback converter is controlled by IC U1 to deliver constant current (Exhibit 22, "25W Constant-Current Dimmable LED Driver") to the output. Flyback converter output voltage +DC will be clamped at approximately 42 V.

62. On information and belief, DSW-LED products include voltage detection means for detecting the output voltage at the output terminals, the voltage detection means generating a detection signal when the output voltage exceeds the predetermined threshold voltage. For example, a voltage detection circuit includes zener diodes D17, D18, and D19, the voltage divider formed by R51 and R52, and transistor-side of opto-isolator U6, outputs a detection

signal when the output voltage +Vo exceeds 42 V—the breakdown voltage of series-connected Zener diodes D17, D18, and D19. The detection signal is input to INV pin 1 and COMP pin 2 of IC U1.

Infringing D211-LED Products

63. On information and belief, 211-LED products include a power supply for an LED light source, as shown for example in the schematics of Exhibit 14. The individual components of 211-LED products cited below refer to Exhibit 14 unless stated otherwise.

64. On information and belief, 211-LED products include input terminals for connecting a supply voltage, for example input terminals Black Wire and White Wire that connect to an AC mains input.

65. On information and belief, 211-LED products include input filter means, for example capacitor C1, C24, and inductors of transformer T1 that filter the AC mains input.

66. On information and belief, 211-LED products include a converter comprising a control circuit, for example a flyback converter comprising transformer T2 and diode D22 that is controlled by controllers IC U3.

67. On information and belief, 211-LED products include output terminals for connecting the semiconductor light source, wherein the converter generates a current for application to the semiconductor light source, and the control circuit controls the converter to produce a predetermined value of the current at the output terminals, the predetermined value of the current corresponding to an output voltage which is less than a predetermined threshold voltage. For example, output terminals Red Wire (LED1+) and Blue Wire (LED 1-) connect to LEDs. The flyback converter generates current for application to the LEDs. The flyback converter is controlled by IC U3 to deliver one of three constant current values—700mA,

1050mA, 1400mA—(Exhibit 16 "Output Current: WC3 700mA, WC2: 1050mA, WC3: 1400mA") to the output The flyback converter output voltage LED+ will be clamped at approximately 42 V.

68. On information and belief, 211-LED products include voltage detection means for detecting the output voltage at the output terminals, the voltage detection means generating a detection signal when the output voltage exceeds the predetermined threshold voltage. For example, a voltage detection circuit, comprising diodes D13, D16, D24, D25, resistors R65 and R66, and transistor side of opto-isolator, provides a detection signal when the output voltage exceeds the cumulative breakdown voltage of 42 V of the series-connected diodes D13, D16, D24, D25.

Infringing D404-LED (Current Generation) Products

69. On information and belief, D404-LED products include a power supply for an LED light source, as shown for example in the schematics of Exhibit 14. The individual components cited below refer to Exhibit 14 unless stated otherwise.

70. On information and belief, D404-LED products include input terminals for connecting a supply voltage, for example Black Wire and White Wire that connect to an AC mains input.

71. On information and belief, D404-LED products include input filter means, for example capacitor C1, C24, and inductors of transformer T1 that filter the AC mains input.

72. On information and belief, D404-LED products include a converter comprising a control circuit, for example a flyback converter comprising transformer T2 and diode D22.

73. On information and belief, D404-LED products include output terminals for connecting the semiconductor light source, wherein the converter generates a current for

application to the semiconductor light source, and the control circuit controls the converter to produce a predetermined value of the current at the output terminals, the predetermined value of the current corresponding to an output voltage which is less than a predetermined threshold voltage. For example, output terminals Red Wire (LED1+) and Blue Wire (LED 1-) connect to LEDs. The flyback converter generates current for application to the LEDs. The flyback converter is controlled by IC U3 to deliver one of three constant current values—700mA, 1050mA, 1400mA—(Exhibit 16, "Output Current: WC3 700mA, WC2: 1050mA, WC3: 1400mA") to the output. The flyback converter output voltage LED+ will be clamped at approximately 42 V. On information and belief, D404-LED products include voltage detection means for detecting the output voltage at the output terminals, the voltage detection means generating a detection signal when the output voltage exceeds the predetermined threshold voltage. For example, a voltage detection circuit, comprising diodes D13, D16, D24, D25, resistors R65 and R66, and transistor side of opto-isolator, provides a detection signal when the output voltage exceeds the cumulative breakdown voltage of 42 V of the series-connected diodes D13, D16, D24, D25.

74. The full extent of Defendant's infringement is not presently known to Philips Lighting. On information and belief, Defendant has made and sold, or will make and sell, products under different names or part numbers that infringe the '014 Patent in a similar manner. Philips Lighting makes this preliminary identification of infringing products and infringed claims in Count One without the benefit of discovery or claim construction in this action, and expressly reserves the right to augment, supplement, and revise its identifications based on additional information obtained through discovery or otherwise.

75. Philips Lighting has suffered and continues to suffer damages as a result of Defendant's infringement of the '014 Patent in an amount to be determined at trial.

76. Defendant's infringement of the '014 Patent is causing irreparable harm for which Philips Lighting has no adequate remedy at law unless Defendant is enjoined by this Court. Under 35 U.S.C. § 283, Philips Lighting is entitled to a permanent injunction against further infringement of the '014 Patent.

77. Defendant has been aware of and has had notice of the '014 Patent and its infringement of the '014 Patent at least as early as the service of this Complaint.

COUNT TWO

INFRINGEMENT OF U.S. PATENT NO. 6,586,890

78. Philips Lighting incorporates by reference the allegations in paragraphs 1-77 as if fully set forth herein.

79. On information and belief, Defendant has infringed and is infringing claims of the '890 Patent, including claims 7 and 31, in violation of 35 U.S.C. § 271(a) and/or 271(b) by manufacturing, using, offering to sell, selling, and/or importing infringing products.

80. Claim 7 of the '890 Patent recites:

> A system for supplying power for an LED array, said system comprising:
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> means for sensing current to the LED array, said current sensing means generating a sensed current signal;
>
> means for generating a reference signal;
>
> means for comparing the sensed current signal to the reference signal, said comparing means generating a feedback signal;
>
> means for modulating pulse width responsive to the feedback signal, said pulse width modulating means generating a drive signal; and

means for supplying power responsive to the drive signal, said power supplying means supplying current to the LED array.

81. On information and belief, Defendant has directly infringed and is directly infringing claim 7 of the '890 Patent by making, using, offering to sell, selling, and/or importing at least Lucera, Zeus, DLED-ARFK4, DSW-LED, and D404-LED (previous generation) products in this judicial district and elsewhere in the United States.

Infringing Lucera Products

82. On information and belief, Lucera products contain a power supply for an LED light source as shown for example in the schematics of Exhibit 7. The individual components cited below refer to Exhibit 7 unless stated otherwise.

83. On information and belief, Lucera products include means for sensing current to the LED array, the current sensing means generating a sensed current signal. For example, current sense resistors R15 and R16 generate a sensed current signal that is proportional to the current through the LEDs. Sensed current signal is propagated through transistor Q2, opto-coupler U2, and transistor Q1, and appears at pin 1 of IC U1.

84. On information and belief, Lucera products include means for generating a reference signal. For example, a reference current source, 4.8 V – 5.8 V is applied to the inverting input of Internal UV Comparator (Exhibit 8).

85. On information and belief, Lucera products include means for comparing the sensed current signal to the reference signal, the comparing means generating a feedback signal. For example, Interval UV Comparator (Exhibit 8) compares the sensed current signal—signal from R15 and R16 which appears at the non-inverting input of UV Comparator—to the 4.8-5.8 V reference signal. The output of Internal UV Comparator is a feedback signal that is applied to Gate Driver ("PWM IC") (Exhibit 8) via Shutdown/Auto-Restart Unit (Exhibit 8).

86. On information and belief, Lucera products include means for modulating pulse width responsive to the feedback signal, the pulse width modulating means generating a drive signal. For example, Gate Driver PWM Control IC (Exhibit 8) generates a drive signal that is applied to the gate of the switch (Exhibit 8). Gate Driver is responsive to the feedback signal output from Internal UV Comparator, which propagates through Shutdown/Auto-Restart Unit (Exhibit 8).

87. On information and belief, Lucera products include means for supplying power responsive to the drive signal, the power supplying means supplying current to the LED array. For example, a flyback converter, comprised of, at least, transformer T2, diode D11, provides current to the LEDs connected to outputs labeled Red Wire and Black Wire. The flyback converter is responsive to a gate drive signal output applied to the gate of switch (Exhibit 8).

Infringing Zeus Products

88. On information and belief, Zeus products contain a power supply for an LED light array, as shown for example in schematics of Exhibit 10. The individual components cited below refer to Exhibit 10 unless stated otherwise.

89. On information and belief, Zeus products include means for sensing current to the LED array, the current sensing means generating a sensed current signal. For example, current sense resistor R35 generates a sensed current signal that is proportional to the current through the LEDs. The current sense signal is applied to the inverting input of comparator U2B.

90. On information and belief, Zeus products include means for generating a reference signal. For example, a reference current source, resistors R44 and R26, generate a reference signal that is applied to the non-inverting input of comparator U2B.

91. On information and belief, Zeus products include means for comparing the sensed current signal to the reference signal, the comparing means generating a feedback signal. For example, the voltage across R35—representative of the current through the LEDs—and a reference current source are applied to the inverting and non-inverting terminals of comparator U2B, respectively. The output of comparator U2B is a feedback signal that is applied, via diode D8 and opto-isolator U3 to the VSENSE, pin 1 of IC U1.

92. On information and belief, Zeus products include means for modulating pulse width responsive to the feedback signal, the pulse width modulating means generating a drive signal. For example, IC U1 is a PWM control IC that creates a PWM drive signal, (GTDRV signal) driving switch Q1. The PWM drive signal is responsive to the feedback signal applied to VSENSE, pin 1, of IC U1.

93. On information and belief, Zeus products include means for supplying power responsive to the drive signal, the power supplying means supplying current to the LED array. For example, a flyback converter, comprised of, at least, transformer T1 diode D5, provides current to LEDs, attached at outputs Red Wire (+DC) and Black Wire (GND). The flyback converter is responsive to a gate drive signal applied to the gate of transistor Q1.

Infringing DLED-ARFK4 Products

94. On information and belief, ARFK4 products include a power supply for an LED light source, as shown for example in the schematics of Exhibit 18. The individual components cited below refer to Exhibit 18 unless stated otherwise.

95. On information and belief, ARFK4 products include means for sensing current to the LED array, the current sensing means generating a sensed current signal. For example, current sense resistor RS3 senses and generates a current sensed signal ("-VO") proportional to

the current flowing through the LEDs. On information and belief, the current sensed signal is applied to Resistor RS5 propagates through opto-isolator PC1, appearing at the inverting terminal of Error Amplifier comparator of ICM1.

96. On information and belief, ARFK4 products include means for generating a reference signal. For example, on information and belief, a reference current source generates a reference signal of 2.5 volts to the non-inverting input of Error Amplifier comparator.

97. On information and belief, ARFK4 products include means for comparing the sensed current signal to the reference signal, the comparing means generating a feedback signal. For example, on information and belief, the voltage across RS3—representative of the current through the LEDs—and a reference current source are applied to the inverting and non-inverting terminals of Error Amplifier comparator, respectively. On information and belief, the output of Error Amplifier comparator is a feedback signal that propagates to PWM control IC.

98. On information and belief, ARFK4 products include means for modulating pulse width responsive to the feedback signal, the pulse width modulating means generating a drive signal. For example, on information and belief, PWM control IC of ICM1 receives the feedback signal and generates a pulse-width modulated drive signal, which is applied to the gate of transistor QM2.

99. On information and belief, ARFK4 products include means for supplying power responsive to the drive signal, the power supplying means supplying current to the LED array. For example, a flyback converter including transformer T1, diode DS1 supplies current to Red Wire (L+) and Black Wire (L-) connected to LEDs. The flyback converter is responsive to a gate drive signal applied to the gate of transistor QM2.

Infringing DSW-LED Products

100. On information and belief, DSW-LED products contain a power supply for an LED light as shown for example in the schematics of Exhibit 20. The individual components cited below refer to Exhibit 20 unless stated otherwise.

101. On information and belief, DSW-LED products include means for sensing current to the LED array, the current sensing means generating a sensed current signal. For example, current sense resistor R25 generates a sensed current signal that is proportional to the current through the LEDs. The current sense signal is applied to the inverting input of comparator U3B.

102. On information and belief, DSW-LED products include means for generating a reference signal. For example, Violet Wire (PWM/Dimmer Control Input) generates a reference signal that is applied to the non-inverting input of comparator U3B.

103. On information and belief, DSW-LED products include means for comparing the sensed current signal to the reference signal, the comparing means generating a feedback signal. For example, the voltage across R25 —representative of the current through the LEDs—and a reference current source are applied to the inverting and non-inverting terminals of comparator U3B, respectively. The output of comparator U3B is a feedback signal that is applied, via diode D9 and opto-isolator U2, to the INV pin 1 of IC U1.

104. On information and belief, DSW-LED products include means for modulating pulse width responsive to the feedback signal, the pulse width modulating means generating a drive signal. For example, IC U1 is a PWM control IC that creates a PWM drive signal, (GD signal) driving transistor Q1. The PWM drive signal is responsive to the feedback signal applied to INV pin 1 of IC U1.

105. On information and belief, DSW-LED products include means for supplying power responsive to the drive signal, the power supplying means supplying current to the LED array. For example, a flyback converter, comprising at least transformer T1, diode D7, provides current to LEDs, attached at outputs Red Wire and Blue Wire. The flyback converter is responsive to a gate drive signal applied to the gate of transistor Q1.

Infringing D404-LED (Previous Generation) Products

106. On information and belief, D404 products contain a power supply for an LED light source as shown for example in the schematic of Exhibit 27. The individual components cited below refer to Exhibit 27 unless stated otherwise.

107. On information and belief, D404 products include means for sensing current to the LED array, the current sensing means generating a sensed current signal. For example, current sense resistor R25, generates a sensed current signal that is proportional to the current through the LEDs. The current sense signal is applied to the inverting input of comparator U2B.

108. On information and belief, D404 products include means for generating a reference signal. For example, reference signal Vs is applied via R25, U5, and R27 to the non-inverting input of comparator U2B.

109. On information and belief, D404 products include means for comparing the sensed current signal to the reference signal, the comparing means generating a feedback signal. For example, the voltage across R25—representative of the current through the LEDs—and a reference current source are applied to the inverting and non-inverting terminals of comparator U2B, respectively. The output of comparator U2B is a feedback signal that is applied, via diode D6 and opto-isolator U3 to the FB pin 1 of IC U1.

110. On information and belief, D404 products include means for modulating pulse width responsive to the feedback signal, the pulse width modulating means generating a drive signal. For example, IC U1 is a PWM control IC that creates a PWM drive signal, (GATE signal) driving switch Q1. The PWM drive signal is responsive to the feedback signal applied to FB pin 1 of IC U1.

111. On information and belief, D404 products include means for supplying power responsive to the drive signal, the power supplying means supplying current to the LED array. For example, a flyback converter, comprised of, at least, transformer T1 diode D5, provides current to LEDs, attached at outputs Red Wire (+DC) and Black Wire (GND). The flyback converter is responsive to a gate drive signal applied to the gate of transistor Q1.

112. Claim 31 (including the limitations of claim 23) of the '890 Patent requires:

> A circuit for supplying power to an LED array comprising:
>
> a power supply 52, the power supply 52 supplying current to the LED array 54 and being responsive to a drive signal;
>
> a current sensor 60 for sensing current to the LED array 54, the current sensor 60 generating a sensed current signal;
>
> a reference current source 62 for generating a reference signal;
>
> a comparator 58 for comparing the sensed current signal to the reference signal, the comparator 58 generating a feedback signal; and
>
> a PWM control IC 56 responsive to the feedback signal, the PWM control IC 56 generating the drive signal;
>
> wherein said power supply is selected from a group consisting of a buck-boost power supply, a boost power supply, a buck power supply, and a flyback converter.

113. On information and belief, Defendant has directly infringed and is directly infringing claim 31 of the '890 Patent by making, using, offering to sell, selling, and/or

importing at least Lucera, Zeus, DLED-ARFK4, DSW-LED, and D404-LED (previous generation) products in this judicial district and elsewhere in the United States.

Infringing Lucera Products

114. On information and belief, Lucera products contain a power supply for an LED light source as shown for example in the schematics of Exhibit 7. The individual components cited below refer to Exhibit 7 unless stated otherwise.

115. On information and belief, Lucera products include a power supply, the power supply supplying current to the LED array and being responsive to a drive signal. For example, a flyback converter, comprised of, at least, transformer T2 and diode D11, provides current to the LEDs connected to outputs labeled Red Wire and Black Wire. The flyback converter is responsive to a gate drive signal output applied to the gate of switch.

116. On information and belief, Lucera products include a current sensor for sensing current to the LED array, the current sensor generating a sensed current signal. For example, current sense resistor resistors R15 and R16 generate a sensed current signal that is proportional to the current through the LEDs. The sensed current signal is propagated through transistor Q2, opto-coupler U2, and transistor Q1, and appears at pin 1 of IC U1.

117. On information and belief, Lucera products include a reference current source for generating a reference signal. For example, a reference current source, 4.8–5.8 V is applied to the inverting input of Internal UV Comparator (Exhibit 8).

118. On information and belief, Lucera products include a comparator for comparing the sensed current signal to the reference signal, the comparator generating a feedback signal. For example, Interval UV Comparator (Exhibit 8) compares the sensed current signal—signal from R15 and R16 which appears at the non-inverting input of UV Comparator—to the 4.8-5.8

V reference signal. The output of Internal UV Comparator is a feedback signal that is applied to Gate Driver ("PWM IC") (Exhibit 8) via Shutdown/Auto-Restart Unit (Exhibit 8).

119. On information and belief, Lucera products include a PWM control IC responsive to the feedback signal, the PWM control IC generating the drive signal. For example, Gate Driver PWM Control IC (Exhibit 8) generates a drive signal that is applied to the gate of the switch (Exhibit 8). Gate Driver is responsive to the feedback signal output from Internal UV Comparator, which propagates through Shutdown/Auto-Restart Unit (Exhibit 8).

120. On information and belief, Lucera products include a power supply selected from a group consisting of a buck-boost power supply, a boost power supply, a buck power supply, and a flyback converter. For example, a flyback converter, comprised of, at least, transformer T2, diode D11, provides current to the LEDs connected to outputs labeled Red Wire and Black Wire.

Infringing Zeus Products

121. On information and belief, Zeus products contain a power supply for an LED light array, as shown for example in schematics of Exhibit 10. The individual components cited below refer to Exhibit 10 unless stated otherwise.

122. On information and belief, Zeus products include a power supply, the power supply supplying current to the LED array and being responsive to a drive signal. For example, a flyback converter, comprised of, at least, transformer T1 and diode D5 and provides current to LEDs, attached at outputs Red Wire (+DC) and Black Wire (GND). The flyback converter is responsive to a gate drive signal applied to the gate of transistor Q1.

123. On information and belief, Zeus products include a current sensor for sensing current to the LED array, the current sensor generating a sensed current signal. For example,

current sense resistor R35 generates a sensed current signal that is proportional to the current through the LEDs. The current sense signal is applied to the inverting input of comparator U2B.

124. On information and belief, Zeus products include a reference current source for generating a reference signal. For example, a reference current source, resistors R44 and R26, generate a reference signal that is applied to the non-inverting input of comparator U2B.

125. On information and belief, Zeus products include a comparator for comparing the sensed current signal to the reference signal, the comparator generating a feedback signal. For example, the voltage across R35—representative of the current through the LEDs—and a reference current source are applied to the inverting and non-inverting terminals of comparator U2B, respectively. The output of comparator U2B is a feedback signal that is applied, via diode D8 and opto-isolator U3, to the VSENSE, pin 1 of IC U1.

126. On information and belief, Zeus products include a PWM control IC responsive to the feedback signal, the PWM control IC generating the drive signal. For example, IC U1 is a PWM control IC that creates a PWM drive signal (GTDRV signal) driving switch Q1. The PWM drive signal is responsive to the feedback signal applied to VSENSE, pin 1, of IC U1.

127. On information and belief, Zeus products include a power supply selected from a group consisting of a buck-boost power supply, a boost power supply, a buck power supply, and a flyback converter. For example, a flyback converter, comprised of, at least, transformer T1 and diode D5, and provides current to LEDs, attached at outputs Red Wire and Black Wire.

Infringing DLED-ARFK4 Products

128. On information and belief, ARFK4 products include a power supply for an LED light source, as shown for example in the schematics of Exhibit 18. The individual components cited below refer to Exhibit 18 unless stated otherwise.

129. On information and belief, ARFK4 products include a power supply, the power supply supplying current to the LED array and being responsive to a drive signal. For example, a flyback converter including transformer T1 and diode DS1 supplies current to Red Wire (L+) and Black Wire (L-) connected to LEDs. The flyback converter is responsive to a gate drive signal applied to the gate of transistor QM2.

130. On information and belief, ARFK4 products include a current sensor for sensing current to the LED array, the current sensor generating a sensed current signal. For example, current sense resistor RS3 senses and generates a current sensed signal ("-VO") proportional to the current flowing through the LEDs. On information and belief, the current sensed signal is applied to Resistor RS5 propagates through opto-isolator PC1, appearing at the inverting terminal of Error Amplifier comparator of ICM1.

131. On information and belief, ARFK4 products include a reference current source for generating a reference signal. For example, on information and belief, a reference current source generates a reference signal of 2.5 volts to the non-inverting input of Error Amplifier comparator.

132. On information and belief, ARFK4 products include a PWM control IC responsive to the feedback signal, the PWM control IC generating the drive signal. For example, on information and belief, the voltage across RS3—representative of the current through the LEDs—and a reference current source are applied to the inverting and non-inverting terminals of Error Amplifier comparator, respectively. On information and belief, the output of Error Amplifier comparator is a feedback signal that propagates to PWM control IC. On information and belief, PWM control IC of ICM1 receives the feedback signal and generates a pulse-width modulated drive signal, which is applied to the gate of transistor QM2.

133. On information and belief, ARFK4 products include a power supply selected from a group consisting of a buck-boost power supply, a boost power supply, a buck power supply, and a flyback converter. For example, a flyback converter including transformer T1 and diode DS1 supplies current to Red Wire (L+) and Black Wire (L-) connected to LEDs.

Infringing DSW-LED Products

134. On information and belief, DSW-LED products contain a power supply for an LED light as shown for example in the schematics of Exhibit 20. The individual components cited below refer to Exhibit 20 unless stated otherwise.

135. On information and belief, DSW-LED products include a power supply, the power supply supplying current to the LED array and being responsive to a drive signal. For example, a flyback converter, comprising at least transformer T1 and diode D7, provides current to LEDs, attached at outputs Red Wire and Blue Wire. The flyback converter is responsive to a gate drive signal applied to the gate of transistor Q1.

136. On information and belief, DSW-LED products include a current sensor for sensing current to the LED array, the current sensor generating a sensed current signal. For example, current sense resistor R25, generates a sensed current signal that is proportional to the current through the LEDs. The current sense signal is applied to the inverting input of comparator U3B.

137. On information and belief, DSW-LED products include a reference current source for generating a reference signal. For example, Violet Wire (PWM/Dimmer Control Input) generates a reference signal that is applied to the non-inverting input of comparator U3B.

138. On information and belief, DSW-LED products include a PWM control IC responsive to the feedback signal, the PWM control IC generating the drive signal. For

example, the voltage across R25—representative of the current through the LEDs—and a reference current source are applied to the inverting and non-inverting terminals of comparator U3B, respectively. The output of comparator U3B is a feedback signal that is applied, via diode D9 and opto-isolator U2, to the INV pin 1 of IC U1. IC U1 is a PWM control IC that creates a PWM drive signal (GD signal) driving transistor Q1. The PWM drive signal is responsive to the feedback signal applied to INV pin 1 of IC U1.

139. On information and belief, DSW-LED products include a power supply selected from a group consisting of a buck-boost power supply, a boost power supply, a buck power supply, and a flyback converter. For example, a flyback converter, comprised of, at least, transformer T1 and diode D7, and provides current to LEDs, attached at outputs Red Wire and Blue Wire.

Infringing D404-LED (Previous Generation) Products

140. On information and belief, D404 products contain a power supply for an LED light source as shown for example in the schematic of Exhibit 27. The individual components of D404-LED cited below refer to Exhibit 27 unless stated otherwise.

141. On information and belief, D404 products include a power supply, the power supply supplying current to the LED array and being responsive to a drive signal. For example, a flyback converter, comprised of, at least, transformer T1 and diode D5, and provides current to LEDs, attached at outputs +DC and GND. The flyback converter is responsive to a gate drive signal applied to the gate of transistor Q1.

142. On information and belief, D404 products include a current sensor for sensing current to the LED array, the current sensor generating a sensed current signal. For example,

current sense resistor R25 generates a sensed current signal that is proportional to the current through the LEDs. The current sense signal is applied to the inverting input of comparator U2B.

143. On information and belief, D404 products include a reference current source for generating a reference signal. For example, reference signal Vs is applied via R25, U5, and R27 to the non-inverting input of comparator U2B.

144. On information and belief, D404 products include a PWM control IC responsive to the feedback signal, the PWM control IC generating the drive signal. For example, the voltage across R25—representative of the current through the LEDs—and a reference current source are applied to the inverting and non-inverting terminals of comparator U2B, respectively. The output of comparator U2B is a feedback signal that is applied, via diode D6 and opto-isolator U3, to the FB pin 1 of IC U1. IC U1 is a PWM control IC that creates a PWM drive signal, (GATE signal) driving switch Q1. The PWM drive signal is responsive to the feedback signal applied to FB pin 1 of IC U1.

145. On information and belief, D404 products include a power supply selected from a group consisting of a buck-boost power supply, a boost power supply, a buck power supply, and a flyback converter. For example, a flyback converter, comprised of, at least, transformer T1 diode D5 and provides current to LEDs, attached at outputs +DC and GND.

146. The full extent of Defendant's infringement is not presently known to Philips Lighting. On information and belief, Defendant has made and sold, or will make and sell, products under different names or part numbers that infringe the '890 Patent in a similar manner. Philips Lighting makes this preliminary identification of infringing products and infringed claims in Count Two without the benefit of discovery or claim construction in this action, and expressly

reserves the right to augment, supplement, and revise its identifications based on additional information obtained through discovery or otherwise.

147. Philips Lighting has suffered and continues to suffer damages as a result of Defendant's infringement of the '890 Patent in an amount to be determined at trial.

148. Defendant's infringement of the '890 Patent is causing irreparable harm for which Philips Lighting has no adequate remedy at law unless Defendant is enjoined by this Court. Under 35 U.S.C. § 283, Philips Lighting is entitled to a permanent injunction against further infringement of the '890 Patent.

149. Defendant has been aware of and has had notice of the '890 Patent and its infringement of the '890 Patent at least as early as the service of this Complaint.

COUNT THREE

INFRINGEMENT OF U.S. PATENT NO. 7,038,399

150. Philips Lighting incorporates by reference the allegations in paragraphs 1-149 as if fully set forth herein.

151. On information and belief, Defendant has infringed and is infringing claims of the '399 Patent, including claim 7, in violation of 35 U.S.C. § 271(a) by manufacturing, using, offering to sell, selling, and/or importing infringing products.

152. Claim 7 of the '399 Patent recites:

> An illumination apparatus, comprising:
>
> at least one LED; and
>
> at least one controller coupled to the at least one LED and configured to receive a power-related signal from an alternating current (A.C.) power source that provides signals other than a standard A.C. line voltage, the at least one controller further configured to provide power to the at least one LED based on the power-related signal,

wherein the A.C. power source is an A.C. dimmer circuit,

wherein the A.C. dimmer circuit is controlled by a user interface to vary the power-related signal, and wherein the at least one controller is configured to variably control at least one parameter of light generated by the at least one LED in response to operation of the user interface, and

wherein the operation of the user interface varies a duty cycle of the power-related signal, and wherein the at least one controller is configured to variably control the at least one parameter of the light based at least on the variable duty cycle of the power-related signal.

153. On information and belief, Defendant has directly infringed and is directly infringing claim 7 of the '399 Patent by making, using, offering to sell, selling, and/or importing at least Zeus, AFR56, and D404-LED products in this judicial district and elsewhere in the United States.

Infringing Zeus Products

154. On information and belief, Zeus products contain an illumination apparatus as shown for example in the schematics of Exhibit 10. The individual components cited below refer to Exhibit 10 unless stated otherwise.

155. On information and belief, Zeus products include at least one LED. For example, Red Wire (+DC) and Black Wire (GND) pins are connected to at least one LED.

156. On information and belief, Zeus products include at least one controller coupled to the at least one LED and configured to receive a power-related signal from an alternating current (A.C.) power source that provides signals other than a standard A.C. line voltage, the at least one controller further configured to provide power to the at least one LED based on the power-related signal. For example, a controller—which includes IC U1 and flyback converter comprising transformer T1 and diode D5 is configured to receive a phase-cut A.C. power signal from Black Wire (L) and White Wire (N) input lines (the controller is configured "For Use with

Incandescent Dimmers," see Exhibit 12). The controller is thus configured to control the LEDs, via the flyback converter, based on the phase-cut A.C. power signal.

157. On information and belief, the controllers in the Zeus products are configured to receive a power-related signal from an A.C. dimmer circuit, wherein the A.C. dimmer circuit is controlled by a user interface to vary the power-related signal, and wherein the at least one controller is configured to variably control at least one parameter of light generated by the at least one LED in response to operation of the user interface. For example, a controller is configured to be used with an incandescent dimmer, which varies the duty cycle of the dimmed signal according to the operation of a user interface such as a dimming switch. (See Exhibit 12, "For Use with Incandescent Dimmers").

158. On information and belief, Zeus products include a controller wherein operation of the user interface varies a duty cycle of the power-related signal, and wherein the at least one controller is configured to variably control the at least one parameter of the light based at least on the variable duty cycle of the power-related signal. For example, IC U1 conditions the output voltage and current provided by the flyback converter in order to variably control the intensity of the LEDs in response to the variation of the duty cycle of the phase-cut input A.C. signal, based on the operation of a user interface. (See Exhibit 12, "For Use with Incandescent Dimmers").

Infringing AFR56 Products

159. On information and belief, AFR56 products include an illumination apparatus as shown for example in the photographs of Exhibit 23. The individual components cited below refer to Exhibit 24 unless stated otherwise.

160. On information and belief, AFR56 products include at least one LED. For example, +Red and –BLK GND pins are connected to at least one LED.

161. On information and belief, AFR56 products include at least one controller coupled to the at least one LED and configured to receive a power-related signal from an alternating current (A.C.) power source that provides signals other than a standard A.C. line voltage, the at least one controller further configured to provide power to the at least one LED based on the power-related signal. For example, a controller—which includes IC U1 and transistor Q1—is configured to receive a phase-cut A.C. power signal from L and N input lines (the controller is configured to receive a signal from an incandescent dimmer, see Exhibit 25, "Dimmable A.C. Input") The controller is configured to control the LEDs, via transistor Q1, based on the phase-cut A.C. power signal.

162. On information and belief, the controllers in the AFR56 products are configured to receive a power-related signal from an A.C. dimmer circuit, wherein the A.C. dimmer circuit is controlled by a user interface to vary the power-related signal, and wherein the at least one controller is configured to variably control at least one parameter of light generated by the at least one LED in response to operation of the user interface. For example, a controller is configured to be used with dimmable AC input, which varies the duty cycle of the dimmed signal according to the operation of a user interface such as a dimming switch. (See Exhibit 25, "Dimmable A.C. Input.")

163. On information and belief, AFR56 products include a controller wherein operation of the user interface varies a duty cycle of the power-related signal, and wherein the at least one controller is configured to variably control the at least one parameter of the light based at least on the variable duty cycle of the power-related signal. For example, IC U1 conditions the output voltage and current provided by transistor Q1 in order to variably control the intensity of

the LEDs in response to the variation of the duty cycle of the phase-cut input A.C. signal, based on the operation of user interface. (See Exhibit 25, "Dimmable A.C. Input.")

Infringing D404-LED (Previous Generation) Products

164. On information and belief, D404 products include an illumination apparatus as shown for example in the schematics of Exhibit 27. The individual components of D404-LED cited below refer to Exhibit 27 unless stated otherwise.

165. On information and belief, D404 products include at least one LED. For example, +DC and GND pins are connected to at least one LED.

166. On information and belief, D404 products include at least one controller coupled to the at least one LED and configured to receive a power-related signal from an alternating current (A.C.) power source that provides signals other than a standard A.C. line voltage, the at least one controller further configured to provide power to the at least one LED based on the power-related signal. For example, a controller—which includes IC U1 and flyback converter comprising transformer T1 and diode D5—is configured to receive a phase-cut A.C. power signal from L and N input lines ("For Use with ELV Dimmers," see Exhibit 29) The controller is thus configured to control the LEDs, via the flyback converter, based on the phase-cut A.C. power signal.

167. On information and belief, the controllers in the D404 products are configured to receive a power-related signal from an A.C. dimmer circuit, wherein the A.C. dimmer circuit is controlled by a user interface to vary the power-related signal, and wherein the at least one controller is configured to variably control at least one parameter of light generated by the at least one LED in response to operation of the user interface. For example, a controller is configured to be used with an ELV dimmer, which varies the duty cycle of the dimmed signal

according to the operation of a user interface such as a dimming switch. ("For Use with ELV Dimmers", see Exhibit 29)

168. On information and belief, D404 products include a controller wherein operation of the user interface varies a duty cycle of the power-related signal, and wherein the at least one controller is configured to variably control the at least one parameter of the light based at least on the variable duty cycle of the power-related signal. For example, IC U1 conditions the output voltage and current provided by the flyback converter in order to variably control the intensity of the LEDs in response to the variation of the duty cycle of the phase-cut input A.C. signal, based on the operation of user interface. ("For Use with ELV Dimmers", see Exhibit 29)

169. Claim 17 of the '399 Patent recites:

> An illumination apparatus, comprising:
>
> at least one LED; and
>
> at least one controller coupled to the at least one LED and configured to receive a power-related signal from an alternating current (A.C.) power source that provides signals other than a standard A.C. line voltage, the at least one controller further configured to provide power to the at least one LED based on the power-related signal,
>
> wherein the A.C. power source is an A.C. dimmer circuit,
>
> wherein the A.C. dimmer circuit is controlled by a user interface to vary the power-related signal, and wherein the at least one controller is configured to variably control at least one parameter of light generated by the at least one LED in response to operation of the user interface, and
>
> wherein the at least one controller includes:
>
> an adjustment circuit to variably control the at least one parameter of light based on the varying power-related signal; and
>
> power circuitry to provide at least the power to the at least one LED based on the varying power-related signal.

170. On information and belief, Defendant has directly infringed and is directly infringing claim 17 of the '399 Patent by making, using, offering to sell, selling, and/or importing at least Zeus and D404 LED (previous generation) products in this judicial district and elsewhere in the United States.

Infringing Zeus Products

171. On information and belief, Zeus products contain an illumination apparatus as shown for example in schematics of Exhibit 10. The individual components of Zeus cited below refer to Exhibit 10 unless stated otherwise.

172. On information and belief, Zeus products include at least one LED. For example, Red Wire (+DC) and Black Wire (GND) pins are connected to at least one LED.

173. On information and belief, Zeus products include at least one controller coupled to the at least one LED and configured to receive a power-related signal from an alternating current (A.C.) power source that provides signals other than a standard A.C. line voltage, the at least one controller further configured to provide power to the at least one LED based on the power-related signal. For example, a controller—which includes IC U1 and flyback converter comprising transformer T1 and diode D5—is configured to receive a phase-cut A.C. power signal from Black Wire (L) and White Wire (N) input lines configured ("For Use with Incandescent Dimmers," Exhibit 12). The controller is thus configured to control the LEDs, via the flyback converter, based on the phase-cut A.C. power signal.

174. On information and belief, the controllers in the Zeus products are configured to receive a power-related signal from an A.C. dimmer circuit, wherein the A.C. dimmer circuit is controlled by a user interface to vary the power-related signal, and wherein the at least one controller is configured to variably control at least one parameter of light generated by the at

least one LED in response to operation of the user interface. For example, a controller is configured to be used with an incandescent dimmer, which varies the duty cycle of the dimmed A. C. signal according to the operation of a user interface such as a dimming switch. ("For Use with Incandescent Dimmers," Exhibit 12).

175. On information and belief, Zeus products include an adjustment circuit to variably control the at least one parameter of light based on the varying power-related signal. For example, IC U1 conditions the output voltage and current provided by the flyback converter in order to variably control the intensity of the LEDs in response to the variation of the duty cycle of the phase-cut input A.C. signal, based on the operation of user interface. ("For Use with Incandescent Dimmers," Exhibit 12).

176. On information and belief, Zeus products include power circuitry to provide at least the power to the at least one LED based on the varying power-related signal. For example, the controller includes IC U1 which variably controls the intensity of the LEDs based on the phase-cut input A.C. signal ("For Use with Incandescent Dimmers," Exhibit 12). The controller also includes a flyback converter, comprising transformer T1 and diode D5, which provides power to the LED based on the phase-cut input A.C. signal.

Infringing D404-LED (Previous Generation) Products

177. On information and belief, D404 products include an illumination apparatus as shown for example in the schematics of Exhibit 27. The individual components of D404-LED cited below refer to Exhibit 27 unless stated otherwise.

178. On information and belief, D404 products include at least one LED. For example, +DC and GND pins are connected to at least one LED.

179. On information and belief, D404 products include at least one controller coupled to the at least one LED and configured to receive a power-related signal from an alternating current (A.C.) power source that provides signals other than a standard A.C. line voltage, the at least one controller further configured to provide power to the at least one LED based on the power-related signal. For example, a controller—which includes IC U1 and flyback converter comprising transformer T1 and diode D5—is configured to receive a phase-cut A.C. power signal from L and N input lines ("For Use with ELV Dimmers," see Exhibit 29) The controller is thus configured to control the LEDs, via the flyback converter, based on the phase-cut A.C. power signal.

180. On information and belief, the controllers in the D404 products are configured to receive a power-related signal from an A.C. dimmer circuit, wherein the A.C. dimmer circuit is controlled by a user interface to vary the power-related signal, and wherein the at least one controller is configured to variably control at least one parameter of light generated by the at least one LED in response to operation of the user interface. For example, a controller is configured to be used with an ELV dimmer, which varies the duty cycle of the dimmed signal according to the operation of a user interface such as a dimming switch. ("For Use with ELV Dimmers," see Exhibit 29).

181. On information and belief, D404 products include an adjustment circuit to variably control the at least one parameter of light based on the varying power-related signal. For example, IC U1 conditions the output voltage and current provided by the flyback converter in order to variably control the intensity of the LEDs in response to the variation of the duty cycle of the phase-cut input A.C. signal, based on the operation of user interface. ("For Use with ELV Dimmers," see Exhibit 29).

182. On information and belief, D404 products include power circuitry to provide at least the power to the at least one LED based on the varying power-related signal. For example, the controller includes IC U1 which variably controls the intensity of the LEDs based on the phase-cut input A.C. signal. The controller also includes a flyback converter, comprising transformer T1 and diode D5, which provides power to the LED based on the phase-cut input A.C. signal.

183. The full extent of Defendant's infringement is not presently known to Philips Lighting. On information and belief, Defendant has made and sold, or will make and sell, products under different names or part numbers that infringe the '399 Patent in a similar manner. Philips Lighting makes this preliminary identification of infringing products and infringed claims in Count Three without the benefit of discovery or claim construction in this action, and expressly reserves the right to augment, supplement, and revise its identifications based on additional information obtained through discovery or otherwise.

184. Philips Lighting has suffered and continues to suffer damages as a result of Defendant's infringement of the '399 Patent in an amount to be determined at trial.

185. Defendant's infringement of the '399 Patent is causing irreparable harm for which Philips Lighting has no adequate remedy at law unless Defendant is enjoined by this Court. Under 35 U.S.C. § 283, Philips Lighting is entitled to a permanent injunction against further infringement of the '399 Patent.

186. On information and belief, Defendant has been aware of and has had notice of the '399 Patent and its infringement of the '399 Patent at least as early as October 21, 2013, and Defendant's infringement of the '399 Patent has been willful.

COUNT FOUR

INFRINGEMENT OF U.S. PATENT NO. 7,262,559

187. Philips Lighting incorporates by reference the allegations in paragraphs 1-186 as if fully set forth herein.

188. On information and belief, Defendant has infringed and is infringing claims of the '559 Patent, including claim 6 in violation of 35 U.S.C. § 271(a) and/or § 271(b) by manufacturing, using, offering to sell, selling, and/or importing infringing products.

189. Claim 6 of the '559 Patent recites:

> A power supply for an LED light source, said power supply comprising:
>
> a power converter operable to provide a regulated power including a LED current and a LED voltage;
>
> an LED control switch operable to control a flow of the LED current through the LED light source; and
>
> a detection circuit operable to provide a detection signal indicative of an operating condition of the LED light source associated with the LED voltage,
>
> wherein said LED control switch is further operable to clamp a peak of the LED current during an initial loading stage of the LED light source,
>
> wherein the detection signal has a first level representative of a load condition of the LED light source, and
>
> wherein the detection signal has a second level representative of either a short condition or an open condition of the LED light source.

190. On information and belief, Defendant has directly infringed and is directly infringing claim 6 of the '559 Patent by making, using, offering to sell, selling, and/or importing at least Lucera, Zeus, Cloud, ARFK4, DSW-LED, D404-LED (current generation), and D211-LED products in this judicial district and elsewhere in the United States.

Infringing Lucera Products

191. On information and belief, Lucera products contain a power supply for an LED light source as shown for example in the schematics of Exhibit 7. The individual components cited below refer to Exhibit 7 unless stated otherwise.

192. On information and belief, Lucera products include a power converter operable to provide a regulated power including a LED current and a LED voltage. For example, a flyback converter comprising, at least, transformer T2 and diode D11, provides regulated power, including an LED current and an LED voltage, to the LEDs connected to outputs labeled Red Wire (VOUT1) and Black Wire (GND1).

193. On information and belief, Lucera products include a LED control switch operable to control a flow of the LED current through the LED light source. For example, the control switch (Exhibit 8) of IC U1 controls the flow of LED current supplied by the flyback converter through the LEDs.

194. On information and belief, Lucera products include a detection circuit operable to provide a detection signal indicative of an operating condition of the LED light source associated with the LED voltage. For example, Internal UV Comparator detection circuit (Exhibit 8) of IC U1 provides a detection signal (signal output to Soft Start, and Shutdown/Auto-Restart, Exhibit 8), indicative of an operating condition (e.g. a short or connected LED) the LED light associated with the LED voltage. The value of Internal UV Comparator detection circuit output signal will be indicative of an operating condition of the LEDs, and will be determined by value of the voltage across resistors R15 and R16 which create a signal that propagates through transistor Q2, opto-coupler U2, and transistor Q1, and appears at C pin 1 of IC U1.

195. On information and belief, Lucera products include a LED control switch further operable to clamp a peak of the LED current during an initial loading stage of the LED light source. For example, IC U1 includes a soft-start function (Exhibit 8) that serves to clamp the LED current during an initial loading stage of the LED light source.

196. On information and belief, Lucera products provide a detection signal with a first level representative of a load condition of the LED light source, and also provide a detection signal with a second level representative of either a short condition or an open condition of the LED light source. For example, Internal UV Comparator detection circuit (Exhibit 8) compares the input at the non-inverting terminal (Receiving signal from control pin C, which is the signal originating at R15 and R16), to a reference signal at the inverting input, which is between 4.8-5.8V. If the input to the non-inverting terminal is less than the reference signal at the inverting terminal, the Internal UV comparator detection circuit will output a low signal indicative of a load condition of the LED light source. If the input to the non-inverting terminal is greater than the reference signal at the inverting terminal, the Internal UV Comparator detection circuit will output a high signal indicative of a short condition of the LED light source.

Infringing Zeus Products

197. On information and belief, Zeus products contain a power supply for an LED light source as shown for example in schematics of Exhibit 10. The individual components cited below refer to Exhibit 10 unless stated otherwise.

198. On information and belief, Zeus products include a power converter operable to provide a regulated power including a LED current and a LED voltage. For example, a flyback converter comprising, at least, transformer T1 and diode D5 provides regulated power, including

an LED current and an LED voltage, to the LEDs connected to the outputs labeled Red Wire (+DC) and Black Wire (GND).

199. On information and belief, Zeus products include a LED control switch operable to control a flow of the LED current through the LED light source. For example, control switch Q1 controls the flow of current supplied by the flyback converter through the LEDs.

200. On information and belief, Zeus products include a detection circuit operable to provide a detection signal indicative of an operating condition of the LED light source associated with the LED voltage For example, Inhibit detection circuit (Exhibit 11) of IC U1 provides a detection signal (signal output to AND gate, Exhibit 11) indicative of an operating condition (e.g. a short or connected LED) of the LED light associated with the LED voltage. The value of Inhibit detection circuit output signal will be indicative of an operating condition of the LEDs, and will be determined by value of the voltage across the LEDs, which appears across resistors R23 and R24 and the non-inverting input of differential amplifier U2A. Differential amplifier U2A creates a signal that propagates through opto-isolator U3 and appears at VAOUT pin 2 of IC U1 and the non-inverting terminal of Inhibit detection circuit.

201. On information and belief, Zeus products include a LED control switch further operable to clamp a peak of the LED current during an initial loading stage of the LED light source. For example, IC U1 includes a "start up with low current consumption" function that serves to clamp the LED current during an initial loading stage of the LED light source.

202. On information and belief, Zeus products provide a detection signal with a first level representative of a load condition of the LED light source, and also provide a detection signal with a second level representative of either a short condition or an open condition of the LED light source. For example, Inhibit detection circuit (Exhibit 11) compares the input at the

non-inverting terminal to 2.2 V reference signal at the inverting terminal. If the input to the non-inverting terminal is less than the reference signal at the inverting terminal, the Inhibit detection circuit will output a low signal indicative of a load condition of the LED light source. If the input to the non-inverting terminal is greater than the reference signal at the inverting terminal, the comparator will output a high signal indicative of an open condition of the LED light source.

Infringing Cloud Products

203. On information and belief, Cloud products include a power supply for an LED light source as shown for example in the schematics of Exhibit 14. The individual components of Cloud cited below refer to Exhibit 14 unless stated otherwise.

204. On information and belief, Cloud products include a power converter operable to provide a regulated power including a LED current and a LED voltage. For example, a flyback converter comprising, at least, transformer T2 and diode D22 provides regulated power, including an LED current and an LED voltage, to LEDs connected to the Red Wire (LED1+) and the Blue Wire (LED1-).

205. On information and belief, Cloud products include a LED control switch operable to control a flow of the LED current through the LED light source. For example, control switch Q3 controls the flow of current supplied by the flyback converter through the LEDs.

206. On information and belief, Cloud products include a detection circuit operable to provide a detection signal indicative of an operating condition of the LED light source associated with the LED voltage For example, overvoltage detection circuit (Exhibit 15) of IC U3 provides a detection signal indicative of an operating condition (e.g. normal operation or an overvoltage condition) of the LED light associated with the LED voltage. The value of overvoltage detection circuit output signal will be indicative of an operating condition of the LEDs, and will be

determined by the value of the voltage across the LEDs, which appears across resistors R40 and R41 and propagates through opto-isolator U1, appearing at INV pin 1 of IC U3 and the input of detection circuit (Exhibit 15).

207. On information and belief, Cloud products include a LED control switch further operable to clamp a peak of the LED current during an initial loading stage of the LED light source. For example, IC U3 provides "ultra-low (≤70 μA) start-up current" (Exhibit 15) which serves to clamps the LED current during an initial loading stage of the LED light source.

208. On information and belief, Cloud products provide a detection signal with a first level representative of a load condition of the LED light source, and also provide a detection signal with a second level representative of either a short condition or an open condition of the LED light source. For example, overvoltage detection circuit (Exhibit 15) outputs a first level signal if an overvoltage condition is not present, and a second level signal if an overvoltage condition (e.g., a short or open) is present.

Infringing DLED-ARFK4 Products

209. On information and belief, ARFK4 products include a power supply for an LED light source as shown for example in the schematics of Exhibit 18. The individual components cited below refer to Exhibit 18 unless stated otherwise.

210. On information and belief, ARFK4 products include a power converter operable to provide a regulated power including a LED current and a LED voltage. For example, a flyback converter comprising, at least, transformer T1 and diode DS1 provides regulated power, including an LED current and an LED voltage, to the LEDs connected to outputs Red (L+) and Black (L-) pins.

211. On information and belief, ARFK4 products include a LED control switch operable to control a flow of the LED current through the LED light source. For example, control switch QM2 controls the flow of current supplied by the flyback converter through the LEDs.

212. On information and belief, ARFK4 products include a detection circuit operable to provide a detection signal indicative of an operating condition of the LED light source associated with the LED voltage For example, on information and belief, Error Amplifier detection circuit of ICM1 provides a detection signal (signal output to multiplier) indicative of an operating condition (e.g. a short or connected LED) of the LED light associated with the LED voltage. The value of Error Amplifier detection circuit output signal will be indicative of an operating condition of the LEDs, and will be determined by value of the voltage across the LEDs which is applied to Resistors RS2 and RS6 and propagates through opto-isolator PC1 and appears at FB pin 1 of IC ICM1 and the input of the inverting terminal of Error Amplifier detection circuit.

213. On information and belief, ARFK4 products include a LED control switch further operable to clamp a peak of the LED current during an initial loading stage of the LED light source. For example, on information and belief, IC ICM1 includes a "low start-up current" function that serves to clamp the LED current during an initial loading stage of the LED light source.

214. On information and belief, ARFK4 products provide a detection signal with a first level representative of a load condition of the LED light source, and also provide a detection signal with a second level representative of either a short condition or an open condition of the LED light source. For example, on information and belief, Error Amplifier detection circuit compares the input at the inverting terminal (Receiving signal from pin 1, which originates at

LED output) to a reference signal at the inverting input, which is 2.5 V. If the input to the inverting terminal is less than the reference signal at the non-inverting terminal, the Error Amplifier detection circuit will output a first signal indicative of a load condition of the LED light source. If the input to the inverting terminal is greater than the reference signal at the non-inverting terminal, the Error Amplifier detection circuit will output a second signal indicative of a short or open condition of the LED light source.

Infringing DSW-LED Products

215. On information and belief, DSW-LED products contain a power supply for an LED light as shown for example in the schematics of Exhibit 20. The individual components cited below refer to Exhibit 20 unless stated otherwise.

216. On information and belief, DSW-LED products include a power converter operable to provide a regulated power including a LED current and a LED voltage. For example, a flyback converter comprising, at least, transformer T1 and diode D7 provides regulated power, including an LED current and an LED voltage, to the LEDs connected to the outputs labeled Red Wire and Blue Wire.

217. On information and belief, DSW-LED products include a LED control switch operable to control a flow of the LED current through the LED light source. For example, control switch Q1 controls the flow of current supplied by the flyback converter through the LEDs.

218. On information and belief, DSW-LED products include a detection circuit operable to provide a detection signal indicative of an operating condition of the LED light source associated with the LED voltage For example, Overvoltage detection circuit (Exhibit 21) of IC U3 provides a detection signal indicative of an operating condition (e.g. normal operation or an overvoltage condition) of the LED light associated with the LED voltage. The value of

overvoltage detection circuit output signal will be indicative of an operating condition of the LEDs, and will be determined by value of the voltage across the LEDs, which appears across resistors R35 and R36 and the non-inverting input of differential amplifier U3A. Differential amplifier U3A generates a signal that propagates through opto-coupler U2 and appears at INV pin 1 of IC U1 and the input of overvoltage detection circuit (Exhibit 21).

219. On information and belief, DSW-LED products include a LED control switch further operable to clamp a peak of the LED current during an initial loading stage of the LED light source. For example, IC U1 includes an "ultra-low (≤70 μA) start-up current" function (Exhibit 21) that serves to clamp the LED current during an initial loading stage of the LED light source.

220. On information and belief, DSW-LED products provide a detection signal with a first level representative of a load condition of the LED light source, and also provide a detection signal with a second level representative of either a short condition or an open condition of the LED light source. For example, Overvoltage detection circuit (Exhibit 21) outputs a first level signal if an overvoltage condition is not present, and a second level signal if an overvoltage condition (e.g., a short or open) is present.

Infringing D404-LED (Current Generation) Products

221. On information and belief, D404 products include a power supply for an LED light source as shown for example in the schematics of Exhibit 14. The individual components cited below refer to Exhibit 14 unless stated otherwise.

222. On information and belief, D404 products include a power converter operable to provide a regulated power including a LED current and a LED voltage. For example, a flyback converter comprising, at least, transformer T2 and diode D22 provides regulated power,

including an LED current and an LED voltage, to LEDs connected to the Red Wire (LED1+) and the Blue Wire (LED1-).

223. On information and belief, D404 products include a LED control switch operable to control a flow of the LED current through the LED light source. For example, control switch Q3 controls the flow of current supplied by the flyback converter through the LEDs.

224. On information and belief, D404 products include a detection circuit operable to provide a detection signal indicative of an operating condition of the LED light source associated with the LED voltage For example, overvoltage detection circuit (Exhibit 15) of IC U3 provides a detection signal indicative of an operating condition (e.g. normal operation or an overvoltage condition) of the LED light associated with the LED voltage. The value of overvoltage detection circuit output signal will be indicative of an operating condition of the LEDs, and will be determined by the value of the voltage across the LEDs, which appears across resistors R40 and R41 and propagates through opto-isolator U1, appearing at INV pin 1 of IC U3 and the input of detection circuit (Exhibit 15).

225. On information and belief, D404 products include a LED control switch further operable to clamp a peak of the LED current during an initial loading stage of the LED light source. For example, IC U3 provides "ultra-low (≤70 μA) start-up current" (Exhibit 15) which serves to clamps the LED current during an initial loading stage of the LED light source.

226. On information and belief, D404 products provide a detection signal with a first level representative of a load condition of the LED light source, and also provide a detection signal with a second level representative of either a short condition or an open condition of the LED light source. For example, overvoltage detection circuit (Exhibit 15) outputs a first level

signal if an overvoltage condition is not present, and a second level signal if an overvoltage condition (e.g., a short or open) is present.

Infringing D211-LED Products

227. On information and belief, 211-LED products include a power supply for an LED light source as shown for example in the schematics of Exhibit 14. The individual components cited below refer to Exhibit 14 unless stated otherwise.

228. On information and belief, 211-LED products include a power converter operable to provide a regulated power including a LED current and a LED voltage. For example, a flyback converter comprising, at least, transformer T2 and diode D22 provides regulated power, including an LED current and an LED voltage, to LEDs connected to the Red Wire (LED1+) and the Blue Wire (LED1-).

229. On information and belief, 211-LED products include a LED control switch operable to control a flow of the LED current through the LED light source. For example, control switch Q3 controls the flow of current supplied by the flyback converter through the LEDs.

230. On information and belief, 211-LED products include a detection circuit operable to provide a detection signal indicative of an operating condition of the LED light source associated with the LED voltage For example, overvoltage detection circuit (Exhibit 15) of IC U3 provides a detection signal indicative of an operating condition (e.g. normal operation or an overvoltage condition) of the LED light associated with the LED voltage. The value of overvoltage detection circuit output signal will be indicative of an operating condition of the LEDs, and will be determined by the value of the voltage across the LEDs, which appears across resistors R40 and R41 and propagates through opto-isolator U1, appearing at INV pin 1 of IC U3 and the input of detection circuit (Exhibit 15).

231. On information and belief, 211-LED products include a LED control switch further operable to clamp a peak of the LED current during an initial loading stage of the LED light source. For example, IC U3 provides "ultra-low (≤70 μA) start-up current" (Exhibit 15) which serves to clamps the LED current during an initial loading stage of the LED light source.

232. On information and belief, 211-LED products provide a detection signal with a first level representative of a load condition of the LED light source, and also provide a detection signal with a second level representative of either a short condition or an open condition of the LED light source. For example, overvoltage detection circuit (Exhibit 15) outputs a first level signal if an overvoltage condition is not present, and a second level signal if an overvoltage condition (e.g., a short or open) is present.

233. Claim 10 of the '559 Patent recites:

> A power supply for an LED light source, said power supply comprising:
>
> a power converter operable to provide a regulated power including a LED current and a LED voltage;
>
> an LED control switch operable to control a flow of the LED current through the LED light source; and
>
> a current sensor operable to sense the LED current flowing through the LED light source, said current sensor including
>
> an [sic] differential amplifier, and
>
> means for adjusting a gain of said differential amplifier,
>
> wherein said LED control switch is further operable to clamp a peak of the LED current during an initial loading stage of the LED light source.

234. On information and belief, Defendant has directly infringed and is directly infringing claim 10 of the '559 Patent by making, using, offering to sell, selling, and/or

importing at least Zeus, DSW-LED, and D404-LED (previous generation) products in this judicial district and elsewhere in the United States.

Infringing Zeus Products

235. On information and belief, Zeus products contain a power supply for an LED light source as shown for example in schematics of Exhibit 10. The individual components cited below refer to Exhibit 10 unless stated otherwise.

236. On information and belief, Zeus products include a power converter operable to provide a regulated power including a LED current and a LED voltage. For example, a flyback converter, comprising at least, transistor T1 and diode D5 provides a regulated power output to LEDs, attached at outputs Red Wire (+DC) and Black Wire (GND).

237. On information and belief, Zeus products include a LED control switch operable to control a flow of the LED current through the LED light source. For example, Control switch Q1 controls the flow of current supplied by the flyback converter through the LEDs.

238. On information and belief, Zeus products include a current sensor operable to sense the LED current flowing through the LED light source, the current sensor including a differential amplifier, and means for adjusting a gain of the differential amplifier. For example, current sensor, including at least current sense resistor R35 and differential amplifier U2B, is operable to sense the current flowing through the LEDs. The voltage across current sense resistor R35, proportional to the current through the LEDs, appears at the inverting input of differential amplifier U2B. The gain of differential amplifier U2B is adjusted according to the values of resistor network comprising R21 and R20.

239. On information and belief, Zeus products include a LED control switch that is operable to clamp a peak of the LED current during an initial loading stage of the LED light

source. For example, IC U1 includes a "start up with low current consumption" function (Exhibit 11) that serves to clamp the LED current during an initial loading stage of the LED light source.

Infringing DSW-LED Products

240. On information and belief, DSW-LED products contain a power supply for an LED light as shown for example in the schematics of Exhibit 20. The individual components cited below refer to Exhibit 20 unless stated otherwise.

241. On information and belief, DSW-LED products include a power converter operable to provide a regulated power including a LED current and a LED voltage. For example, a flyback converter, comprised of, at least, transistor T1 and diode D7 provides a regulated power output to LEDs, attached at outputs Red Wire and Blue Wire.

242. On information and belief, DSW-LED products include a LED control switch operable to control a flow of the LED current through the LED light source. For example, a control switch Q1 controls the flow of current supplied by the flyback converter through the LEDs.

243. On information and belief, DSW-LED products include a current sensor operable to sense the LED current flowing through the LED light source, the current sensor including a differential amplifier, and means for adjusting a gain of the differential amplifier. For example, current sensor, including at least current sense resistor R25 and differential amplifier U3B, is operable to sense the current flowing through the LEDs. The voltage across current sense resistor R25, proportional to the current through the LEDs, appears at the inverting input of differential amplifier U3B. The gain of differential amplifier U3B is adjusted according to the values of resistor network comprising R32 and R33.

244. On information and belief, DSW-LED products include a LED control switch that is operable to clamp a peak of the LED current during an initial loading stage of the LED light source. For example, IC U1 includes an "ultra-low (≤70 μA) start-up current" function (Exhibit 21) that serves to clamp the LED current during an initial loading stage of the LED light source.

Infringing D404-LED (Previous Generation) Products

245. On information and belief, D404 products contain a power supply for an LED light source as shown for example in the schematic of Exhibit 27. The individual components cited below refer to Exhibit 27 unless stated otherwise.

246. On information and belief, D404 products include a power converter operable to provide a regulated power including a LED current and a LED voltage. For example, a flyback converter, comprising at least, transformer T1 and diode D5 provides a regulated power output to LEDs, attached at outputs +DC and GND.

247. On information and belief, D404 products include a LED control switch operable to control a flow of the LED current through the LED light source. For example, a control switch Q1 controls the flow of current supplied by the flyback converter through the LEDs.

248. On information and belief, D404 products include a current sensor operable to sense the LED current flowing through the LED light source, the current sensor including a differential amplifier, and means for adjusting a gain of the differential amplifier. For example, current sensor, including at least current sense resistor R25 and differential amplifier U2B, is operable to sense the current flowing through the LEDs. The voltage across current sense resistor R25, proportional to the current through the LEDs, appears at the inverting input of differential amplifier U2B. The gain of differential amplifier U2B is adjusted according to the values of resistor network comprising R20 and R21.

249. On information and belief, D404 products include a LED control switch that is operable to clamp a peak of the LED current during an initial loading stage of the LED light source. For example, IC U1 includes an "ultra-low (≤50μA) start-up current" function (Exhibit 28) that serves to clamp the LED current during an initial loading stage of the LED light source.

250. Claim 11 of the '559 Patent recites:

> A power supply for an LED light source, said power supply comprising:
>
> a power converter operable to provide a regulated power including a LED current and a LED voltage;
>
> an LED control switch operable to control a flow of the LED current through the LED light source; and
>
> a voltage sensor operable to sense the LED voltage applied to the LED light source, said voltage sensor including
>
> an [sic] differential amplifier, and
>
> means for adjusting a gain of said differential amplifier,
>
> wherein said LED control switch is further operable to clamp a peak of the LED current during an initial loading stage of the LED light source.

251. On information and belief, Defendant has directly infringed and is directly infringing claim 11 of the '559 Patent by making, using, offering to sell, selling, and/or importing at least Zeus, DSW-LED, and D404-LED (Previous Generation) products in this judicial district and elsewhere in the United States.

Infringing Zeus Products

252. On information and belief, Zeus products contain a power supply for an LED light source as shown for example in schematics of Exhibit 10. The individual components cited below refer to Exhibit 10 unless stated otherwise.

253. On information and belief, Zeus products include a power converter operable to provide a regulated power including a LED current and a LED voltage. For example, a flyback converter, comprised of, at least, transformer T1 and diode D5 provides a regulated power output to LEDs, attached at outputs Red Wire (+DC) and Black Wire (GND).

254. On information and belief, Zeus products include a LED control switch operable to control a flow of the LED current through the LED light source. For example, a control switch Q1 controls the flow of current supplied by the flyback converter through the LEDs.

255. On information and belief, Zeus products include a voltage sensor operable to sense the LED voltage applied to the LED light source, the voltage sensor including a differential amplifier, and means for adjusting a gain of the differential amplifier. For example, a voltage sensor includes differential amplifier U2A and is operable to sense the voltage applied to the LEDs. The voltage across LEDs (+DC) appears across resistors R23 and R24 at the inverting input of differential amplifier U2A. The gain of differential amplifier U2A is adjusted according to the resistor R22.

256. On information and belief, Zeus products include a LED control switch that is operable to clamp a peak of the LED current during an initial loading stage of the LED light source. For example, IC U1 includes a "start up with low current consumption" function (Exhibit 11) that serves to clamp the LED current during an initial loading stage of the LED light source.

Infringing DSW-LED Products

257. On information and belief, DSW-LED products contain a power supply for an LED light as shown for example in the schematics of Exhibit 20. The individual components cited below refer to Exhibit 20 unless stated otherwise.

258. On information and belief, DSW-LED products include a power converter operable to provide a regulated power including a LED current and a LED voltage. For example, a flyback converter, comprised of, at least, transformer T1 and diode D7 provides a regulated power output to LEDs, attached at outputs Red Wire and Blue Wire.

259. On information and belief, DSW-LED products include a LED control switch operable to control a flow of the LED current through the LED light source. For example, a control switch Q1 controls the flow of current supplied by the flyback converter through the LEDs.

260. On information and belief, DSW-LED products include a voltage sensor operable to sense the LED voltage applied to the LED light source, the voltage sensor including a differential amplifier, and means for adjusting a gain of the differential amplifier. For example, a voltage sensor includes differential amplifier U3A and is operable to sense the voltage applied to the LEDs. The voltage across LEDs (Vo+) appears across resistors R35 and R36 at the inverting input of differential amplifier U3A. The gain of differential amplifier U3A is adjusted according to the resistor network comprising R34, R35, R36, and R37.

261. On information and belief, DSW-LED products include a LED control switch that is operable to clamp a peak of the LED current during an initial loading stage of the LED light source. For example, IC U1 includes an "ultra-low (≤70 μA) start-up current" function (Exhibit 21) that serves to clamp the LED current during an initial loading stage of the LED light source.

Infringing D404-LED (Previous Generation) Products

262. On information and belief, D404 products contain a power supply for an LED light source as shown for example in the schematic of Exhibit 27. The individual components cited below refer to Exhibit 27 unless stated otherwise.

263. On information and belief, D404 products include a power converter operable to provide a regulated power including a LED current and a LED voltage. For example, a flyback converter, comprising at least, transformer T1 and diode D5 provides a regulated power output to LEDs, attached at outputs +DC and GND.

264. On information and belief, D404 products include a LED control switch operable to control a flow of the LED current through the LED light source. For example, a control switch Q1 controls the flow of current supplied by the flyback converter through the LEDs.

265. On information and belief, D404 products include a voltage sensor operable to sense the LED voltage applied to the LED light source, the voltage sensor including a differential amplifier, and means for adjusting a gain of the differential amplifier. For example, a voltage sensor includes differential amplifier U2A and is operable to sense the voltage applied to the LEDs. The voltage across LEDs (+DC) appears across resistors R23 and R24 at the non-inverting input of differential amplifier U2A. The gain of differential amplifier U2A is adjusted according to the resistor network comprising R22, R23, R24, and R25.

266. On information and belief, D404 products include a LED control switch that is operable to clamp a peak of the LED current during an initial loading stage of the LED light source. For example, IC U1 includes an "ultra-low (≤50μA) start-up current" function (Exhibit 28) that serves to clamp the LED current during an initial loading stage of the LED light source.

267. The full extent of Defendant's infringement is not presently known to Philips Lighting. On information and belief, Defendant has made and sold, or will make and sell, products under different names or part numbers that infringe the '559 Patent in a similar manner. Philips Lighting makes this preliminary identification of infringing products and infringed claims in Count Five without the benefit of discovery or claim construction in this action, and expressly

reserves the right to augment, supplement, and revise its identifications based on additional information obtained through discovery or otherwise.

268. Philips Lighting has suffered and continues to suffer damages as a result of Defendant's infringement of the '559 Patent in an amount to be determined at trial.

269. Defendant's infringement of the '559 Patent is causing irreparable harm for which Philips Lighting has no adequate remedy at law unless Defendant is enjoined by this Court. Under 35 U.S.C. § 283, Philips Lighting is entitled to a permanent injunction against further infringement of the '559 Patent.

270. On information and belief, Defendant has been aware of and has had notice of the '559 Patent and its infringement of the '559 Patent at least as early as October 21, 2013, and Defendant's infringement of the '559 Patent has been willful.

COUNT FIVE

INFRINGEMENT OF U.S. PATENT NO. 8,070,328

271. Philips Lighting incorporates by reference the allegations in paragraphs 1-270 as if fully set forth herein.

272. On information and belief, Defendant has infringed and is infringing claims of the '328 Patent, including claim 1 in violation of 35 U.S.C. § 271(a) and/or § 271(b) by manufacturing, using, offering to sell, selling, and/or importing infringing products.

273. Claim 1 of the '328 Patent recites:

> An LED downlight fixture, comprising:
>
> an array of LEDs in thermal connectivity with a heatsink, said array of LEDs positioned adjacent a first aperture of a multi-piece reflector assembly;
>
> said multi-piece reflector assembly including:

> a first reflector having said first aperture disposed in an upper portion of said first reflector and an opposed larger second aperture in a lower portion of said first reflector;
>
> a second reflector having a first aperture positioned adjacent said second aperture of said first reflector and a second aperture opposite said first aperture of said second reflector and defining a light exit passageway;
>
> a diffuser positioned proximal to and extending across said second aperture of said first reflector and said first aperture of said second reflector.

274. On information and belief, Defendant has directly infringed and is directly infringing claim 1 of the '328 Patent by making, using, offering to sell, selling, and/or importing at least AFR56 products in this judicial district and elsewhere in the United States.

Infringing AFR56 Products

275. On information and belief, AFR56 Products are LED downlight fixtures as shown for example in Exhibit 23. The individual components cited below refer to Exhibit 23 unless stated otherwise.

276. On information and belief, AFR56 products include an array of LEDs in thermal connectivity with heat sink and are positioned adjacent to the first aperture of a multi-piece reflector

277. On information and belief, AFR56 products include a multi-piece reflector having a first aperture disposed in an upper portion of the first reflector and a second, larger, aperture disposed in a lower portion.

278. On information and belief, AFR56 products include a multi-piece reflector having a first aperture disposed in an upper portion of the second reflector and a second, larger, aperture disposed in a lower portion. The first aperture of the second reflector is adjacent to the second aperture of the second reflector. The second reflector defines a light exit passageway.

279. On information and belief, AFR56 products include a diffuser positioned proximal to and extending across the second aperture of the first reflector and the first aperture of said second reflector.

280. The full extent of Defendant's infringement is not presently known to Philips Lighting. On information and belief, Defendant has made and sold, or will make and sell, products under different names or part numbers that infringe the '328 Patent in a similar manner. Philips Lighting makes this preliminary identification of infringing products and infringed claims in Count Five without the benefit of discovery or claim construction in this action, and expressly reserves the right to augment, supplement, and revise its identifications based on additional information obtained through discovery or otherwise.

281. Philips Lighting has suffered and continues to suffer damages as a result of Defendant's infringement of the '328 Patent in an amount to be determined at trial.

282. Defendant's infringement of the '328 Patent is causing irreparable harm for which Philips Lighting has no adequate remedy at law unless Defendant is enjoined by this Court. Under 35 U.S.C. § 283, Philips Lighting is entitled to a permanent injunction against further infringement of the '328 Patent.

283. Defendant has been aware of and has had notice of the '328 Patent and its infringement of the '328 Patent at least as early as the service of this Complaint.

PRAYER FOR RELIEF

WHEREFORE, Philips Lighting prays for the following judgments and relief:

(a) A judgment that Defendant has infringed and is infringing the Patents-in-Suit;

(b) A permanent injunction against Defendant and its affiliates, subsidiaries, assigns, employees, agents or anyone acting in privity or concert from infringing the Patents-in-Suit, including enjoining the making, offering to sell, selling, using, or importing into the United States products claimed in any of the claims of the Patents-in-Suit; using or performing methods claimed in any of the claims of the Patents-in-Suit; inducing others to use and perform methods that infringe any claim of the Patents-in-Suit; or contributing to others using and performing methods that infringe any claim of the Patents-in-Suit, until the expiration of the Patents-in-Suit;

(c) An award of damages adequate to compensate Philips Lighting for Defendant's patent infringement, and an accounting to adequately compensate Philips Lighting for the infringement, including, but not limited to, lost profits and/or a reasonable royalty;

(d) An award of pre-judgment and post-judgment interest at the maximum rate allowed by law;

(e) An order finding that this is an exceptional case and awarding Philips Lighting its costs, expenses, disbursements, and reasonable attorneys' fees related to Defendant's patent infringement under 35 U.S.C. § 285 and all other applicable statutes, rules and common law; and

(f) Such other further relief, in law or equity, as this Court deems just and proper.

JURY TRIAL

In accordance with Rule 38 of the Federal Rules of Civil Procedure, Philips Lighting hereby demands a jury trial on all issues triable before a jury.

Dated: April 12, 2017

Respectfully submitted,

BOND, SCHOENECK & KING, PLLC

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